

Date=12/08/2020

Lecture By=Shubham Joshi

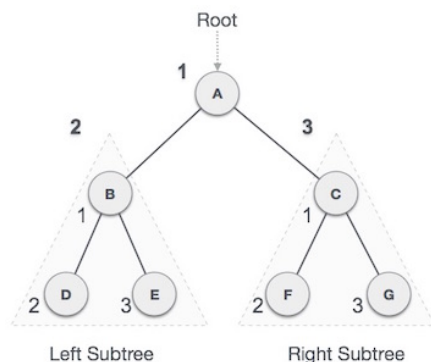
Subject ⇒ Tree

IN PREVIOUS LECTURE (QUICK RECAP) Date-10/08/2020	In Today's Lecture (Overview)
<a href="#">Queue In Python</a> <a href="#">Front And Rear in Queue In Python</a> <a href="#">Python Program To Implement Queue In Python</a> <a href="#">Question Regarding Queue</a> <a href="#">Trees In Python</a> <a href="#">What is Leaf Node</a> <a href="#">Complete Binary Tree</a> <a href="#">Full Binary Tree</a> <a href="#">MCQs</a> <a href="#">Questions For Self Practice</a>	<a href="#">Types of Traversal in Tree</a> ⇒ <a href="#">Preorder Traversal In Tree</a> ⇒ <a href="#">InOrder Traversal</a> ⇒ <a href="#">Postorder Traversal</a> <a href="#">Question That Was Solved/Discussed Regarding Traversal</a> <a href="#">MCQs</a> <a href="#">Questions For self practice/Assignment for the Day</a>

## Types of Traversal in Tree

### ⇒ Preorder Traversal In Tree

In this traversal method, the root node is visited first, then the left subtree and finally the right subtree.



We start from A, and following pre-order traversal, we first visit A itself and then move to its left subtree B. B is also traversed pre-order. The process goes on until all the nodes are visited. The output of pre-order traversal of this tree will be –

$$A \rightarrow B \rightarrow D \rightarrow E \rightarrow C \rightarrow F \rightarrow G$$

### Algorithm

Until all nodes are traversed –

Step 1 – Visit the root node.

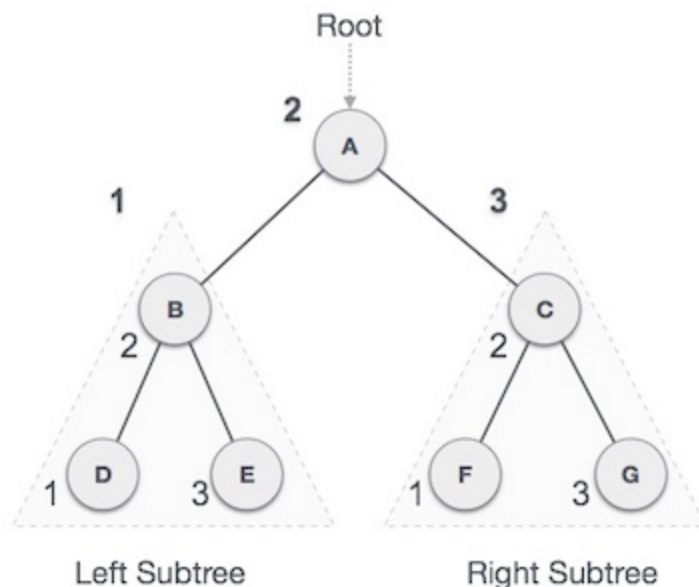
Step 2 – Recursively traverse left subtree.

Step 3 – Recursively traverse right subtree.

### ⇒ InOrder Traversal

In this traversal method, the left subtree is visited first, then the root and later the right sub-tree. We should always remember that every node may represent a subtree itself.

If a binary tree is traversed in-order, the output will produce sorted key values in an ascending order.



We start from A, and following in-order traversal, we move to its left subtree B. B is also traversed in-order. The process goes on until all the nodes are visited. The output of inorder traversal of this tree will be –

$$D \rightarrow B \rightarrow E \rightarrow A \rightarrow F \rightarrow C \rightarrow G$$

## Algorithm

Until all nodes are traversed -

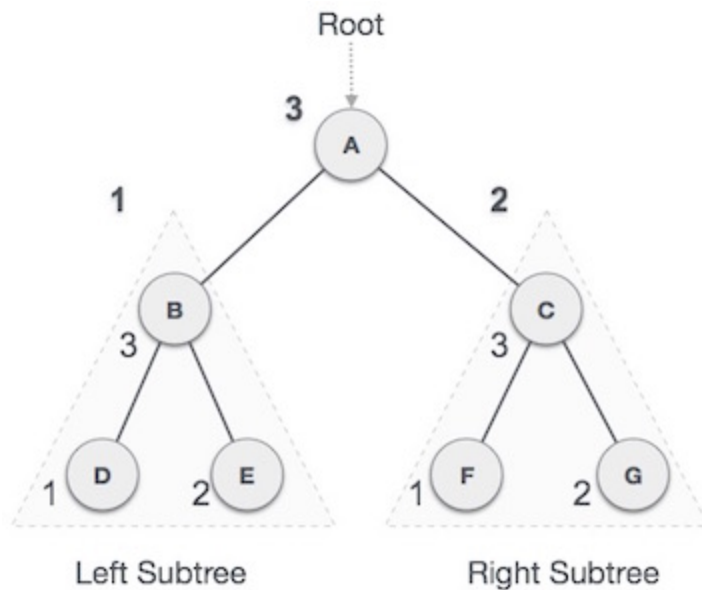
Step 1 - Recursively traverse left subtree.

Step 2 - Visit root node.

Step 3 - Recursively traverse right subtree.

### ⇒Postorder Traversal

In this traversal method, the root node is visited last, hence the name. First we traverse the left subtree, then the right subtree and finally the root node.



We start from A, and following Post-order traversal, we first visit the left subtree B. B is also traversed post-order. The process goes on until all the nodes are visited. The output of post-order traversal of this tree will be -

$$D \rightarrow E \rightarrow B \rightarrow F \rightarrow G \rightarrow C \rightarrow A$$

## Algorithm

Until all nodes are traversed -

Step 1 - Recursively traverse left subtree.

Step 2 - Recursively traverse right subtree.

Step 3 - Visit root node.

# Question That Was Solved/Discussed Regarding Traversal

## 94. Binary Tree Inorder Traversal

Medium    3332    140    Add to List    Share

Given a binary tree, return the *inorder* traversal of its nodes' values.

**Example:**

Input: [1,null,2,3]

```
  1
   \
    2
   /
  3
```

Output: [1,3,2]

### Code

```
class Solution(object):
    def inorderTraversal(self, root):
        """
        :type root: TreeNode
        :rtype: List[int]
        """
        output = []
        self.inorder(root, output)
        return output
```

```
def inorder(self, root, output):  
    if root is None:  
        return  
  
    self.inorder(root.left, output)  
    output.append(root.val)  
    self.inorder(root.right, output)
```

Question Link <https://leetcode.com/problems/binary-tree-inorder-traversal/>

## MCQs

1.What is the preorder traversal of the tree ?

A=5 -1 7 15 8

B=5 7 8 15 -1

C=5 -1 7 8 15

2.what will be the post order traversal of the tree ?2

A=8 15 7 5 -1

B=-1 8 15 7 5

C=8 15 7 -1 5

## Questions For self practice/Assignment for the Day

1. <https://leetcode.com/problems/binary-tree-inorder-traversal/>
2. <https://leetcode.com/problems/binary-tree-postorder-traversal/>
3. <https://leetcode.com/problems/binary-tree-preorder-traversal/>